

**Algebra H**  
**8.5-8.6 Review – Day 2**

**Name:**  
**Period:**

Quick Warm-up: Write the equation of the exponential function based on the following tables

$$\frac{9}{6} = \frac{3}{2}$$

|   |    |    |    |     |     |
|---|----|----|----|-----|-----|
| x | -1 | 0  | 1  | 2   | 3   |
| y | 4  | 12 | 36 | 108 | 324 |

Handwritten notes for the first table:  
 Above x: +1, +1, +1 (with arcs)  
 Below x: x3, x3 (with arcs)  
 Next to table: EXPONENTIAL

$$y = 12(3)^x$$

|   |    |    |   |      |       |
|---|----|----|---|------|-------|
| x | -2 | -1 | 0 | 1    | 2     |
| y | 4  | 6  | 9 | 13.5 | 20.25 |

Handwritten notes for the second table:  
 Above x: +1, +1, +1 (with arcs)  
 Below x: x3, x3 (with arcs)  
 Next to table: EXPONENTIAL

$$y = 9\left(\frac{3}{2}\right)^x$$

**Application of Exponential Growth/Decay Models**

**Exponential Growth/Decay Model:**

\*  $y = C(1 \pm r)^t$   
OR in other words

Final amount = initial amount  $(1 \pm \text{rate})^{\text{time}}$

Make sure your "rate" is a decimal

"+" if Growing  
"-" if Decreasing

**Example 1 – Compound Interest**

You deposit \$500 in an account that pays 8% annual interest compounded yearly. What is the account balance after 6 years?

Handwritten notes for Example 1:  
 $r = 8\% = 0.08$

A) In this situation would we add the rate (growth) or subtract the rate (decay)?

Handwritten answer: growth

B) Using the formula, write the equation that represents this equation:

$$y = C(1+r)^t$$

$$y = 500(1+0.08)^t \rightarrow y = 500(1.08)^t$$

C) How much would be in the account after 6 years?

$$y = 500(1.08)^6$$

$$\boxed{\$793.44}$$

D) How much would the \$500 be worth after 35 years?

$$y = 500(1.08)^{35}$$

$$\boxed{\$7,000.07}$$

**Example 2 – Cell phone value:**

You purchase a cell phone for \$125. The value of the cell phone decreases by about 20% annually.

Handwritten note: = C

Handwritten note:  $0.2 r =$

A) In this situation would we add the rate (growth) or subtract the rate (decay)?

Handwritten answer: decay

B) Using the formula, write the equation that represents this equation:

$$y = C(1-r)^t$$

$$y = 125(1-0.2)^t \Rightarrow y = 125(0.8)^t$$

C) How much would the cell phone be worth after 6 years?

$$y = 125(0.8)^6$$

$$y = \$32.77$$

D) Would the value of the phone ever be \$0? Explain why or why not

Handwritten answer: no → because you can't put any value in for t &

$$y = 500(1.08)^{-t}$$

\$ 7392.67

no → because you can't  
put any value in for  $t$  &  
get a neg. # or 0



### Example 3 – Computer growth:

One computer industry expert reported that there were about 600 million computers in use worldwide in 2001 and that the number was increasing at an annual rate of 10%.

- a. Write a function that models the number of computers in use over time

$$y = 600(1 + 0.1)^t \quad \leftarrow y \text{ is in millions} \quad y = 600,000,000(1.1)^t$$
$$y = 600(1.1)^t$$

- b. Use the function to predict the number of computers that will be in use worldwide in 2012 if the growth rate continues.

$$y = 600(1.1)^{11}$$
$$y = \boxed{1711.87 \text{ million}}$$
$$171,870,000$$
$$\begin{array}{r} 2012 \\ - 2001 \\ \hline 11 = t \end{array}$$

- c. What could cause this rate of increase to change? Do you think it is greater or less than 10% today?

### Example 4 – Tennis Tournament

Each year the local country club sponsors a tennis tournament. Play starts with 128 participants. During each round, half of the players are eliminated.



- a. Write a function that models the number of participants as each round is played.

$$y = 128(1 - 0.5)^t \Rightarrow y = 128(0.5)^t$$

decay

- b. How many players would there be after 5 rounds?

$$y = 128(0.5)^5$$
$$y = \boxed{4 \text{ players}}$$

### Example 5 – Home purchase

You have inherited land that was purchased for \$30,000 in 1960. The value of the land increased approximately 5% per year.

- a. Write a function that models the value of the house over time

$$y = 30000(1.05)^t$$

- b. How much would you expect the land to be worth in 2011?

$$y = 30000(1.05)^{51}$$
$$y = \boxed{\$361,223.09}$$
$$\begin{array}{r} 2011 \\ - 1960 \\ \hline 51 \end{array}$$

- c. The actual value of the land in 2011 was actually \$250,000. What could have caused the difference?

